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UPA-01235

REMARKS

In the Office Action, claims 1-15 are rejected under 35 U.S.C. §112 as being indefinite, claims 1-5, 7-13 and 15 are rejected under 35 U.S.C. §102(b) as being anticipated by EP 0 477 220 B1, and claims 6 and 14 are rejected under 35 U.S.C. §103(a) as being unpatentable over EP 0 477 220 B1.

Claims 1-15 are now cancelled. New claims 16-39 are presented to clearly define the invention in a patentable way to overcome the rejections under 35 U.S.C. §112, 35 U.S.C. §102(b) and 35 U.S.C. §103(a). Specifically, the new base claims 16 and 26 include a new method to dissolve nucleic acid completely in a medium by **dissolving a water insoluble medium in a first solvent to form a first mixture, dissolving nucleic acid in a second solvent to form a second mixture and then mixing the first and second mixtures to form a third mixture**. None of the cited prior art has taught or suggested the claimed method of preparing the mixture for labeling. It is important to note that the new method of this invention dissolves nucleic acid completely in a water-insoluble medium. That means the labeling is water-insoluble and would not be easily erased. Therefore, the labeling for authentication could last for a long period of time.

Applicants request reconsideration of the above rejections for the following reason:

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### Rejection Under 35 U.S.C. §112

Claims 1-15 have been re-written as new claims 16-39 so that the subject matter is distinctly claimed and all the informalities in the original claims are corrected in the new claims to overcome the rejection.

### Rejection Of Claims under 35 U.S.C. §102(b)

Claims 16-39 recite and define novel physical features that are patentable over the cited reference EP 0 477 220 B1. The new base claims 16 and 26 have recited the detailed and distinctive steps to label an article or substance with nucleic acid. The present invention distinguishes over EP '220 under 35 U.S.C. 102(b) as follows:

- (1) The present invention utilizes a new principle of operation. The subject matter of the invention provides a new method to completely dissolve nucleic acid that is water-soluble in a water insoluble medium. There is not any detergent used in the present invention. There is no such disclosure in EP '220 and any other references.
- (2) The present invention provides a novel method to protect the nucleic acids from nuclease and other active chemicals. This is a very important step since the purpose of authentication is to be able to trace the taggant, even after a long period of time of labeling. The protective composition used in the present invention, such as polycarbonate, is an inert medium and is not deteriorative to the article or substance labeled. The protective composition mentioned in EP '220 were lipophilic compositions such as liposome or other polymeric substances like virus coat protein. However, there was not any polymeric substance used for protection in examples of

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EP '220. Therefore encapsulation by polymeric substances would not be possible or simply inoperative in EP '220.

**Rejection Of Claims under 35 U.S.C. §103(a)**

The rejection of claims 6 and 14 presumes that their base claim is not allowable. Claim 6 has been rewritten while claim 14 has been deleted from the present invention. If the new base claims 16 and 26 are allowable, the dependent claims 17-25 and 27-35 should also be allowable by virtue of dependency.

All the distinction are submitted to be of patentable merit under 35 U.S.C. §103(a), and the reasons are in the following:

- (1) If the usage of polymeric substances to encapsulate nucleic acids were in fact obvious, because of its advantages, those skilled in the art surely would have implemented it by now. However, the fact that those skilled in the art have not implemented the invention, despite it was suggested in the cited prior art EP '220, indicates that it is not obvious.
- (2) The invention solves a different problem than the reference. The nucleic acid used in EP '220 is restricted to at least 20 and no longer than 1,000 nucleotides in length. However, there is no restriction of the length of nucleic acid in the present invention, even the genomic deoxyribonucleic acid could be used for labeling. That means more complicated labeling could be made so that a counterfeiting is not possible.
- (3) The most important is that the invention discloses a new method to dissolve nucleic acid completely in a water-insoluble medium. That means the labeling is water-

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insoluble and would not be easily erased. Therefore, the labeling for authentication could last for a long period of time. The fact that the nucleic acid dissolved in distilled water was used directly for labeling in EP '220 would result in the damage of the nucleic acid.

#### US Patent 5,643,728

As to US 5,643,728, Slater et al. disclose a method to mark a liquid by adding particles, microbeads or microspheres, comprising nucleic acid and non-nucleic acid signal means. However, the DNA taggant has to be attached to the beads before labeling. In the present invention, nucleic acid can be mixed with water-insoluble medium without attaching to microbeads. The rewritten claims are patentable over the prior arts since applicants disclose a new method to label the article or substance with nucleic acid.

#### Conclusion

By the above amendment, applicants have amended the title to avoid the misunderstanding and emphasize the novelty of the invention.

Applicants have also amended the specification editorially and have corrected those errors noted by the Examiner. The term "ribonucleic acid" used in the original specification and title is replaced by "nucleic acid" to more clearly describe the invention. The acronym "PCR" which abbreviates Polymerase Chain reaction is spelled out on its first use.

Also applicants have rewritten all claims to define the invention more particularly and distinctively so as to overcome the technical rejections and to define the invention in

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a patentable manner over the cited prior arts. The above amendment results in four claims in excess of twenty that require additional filing fee \$36.00. The Credit Card Payment Form PTO-2038 is submitted for the payment of \$91.00 to cover the additional filing fee \$36.00 and extension fee \$55.00.

For all the above reasons, applicants respectfully submit that the errors in the specification and claims are corrected, that the specification and claims are now in proper form, and that the claims are defined patentably over the prior art. Therefore, applicants submit that this application is now in full condition for allowance. Prompt and favorable reconsideration of the application is respectfully solicited.

Respectfully submitted,



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Version with Markings to Show Changes Made

TITLE:

A Method Of Utilizing [Ribonucleic] Nucleic Acid As Markers For Product Anti-Counterfeit Labeling And Verification

SPECIFICATION:

Page 1, lines 6-20, amend the paragraph as:

One of the problems [that] frequently encountered in product manufacturing and marketing is imitation and counterfeit. Imitations and counterfeits mimic the shape and brand of authenticity and take advantages of its images to make profits. [ ; ]Most of the time imitations and counterfeits are look alike with poor quality. [ ; there] There are also some with near-authenticity quality, but due to lacking advertising and marketing cost, they can be sold in lower price to rob the market share. In addition, valuable items such as painting, jewelry and souvenirs and items with monetary values such as credit card, checkbook and stocks also constantly face the problem of counterfeiting. Problems like these not only ruin the reputation of the authentic products, affecting sales, [can further jeopardize] but also jeopardize the monetary order and invention creativity. Therefore, there is a need and necessity to counter imitations and counterfeits.

Page 1, line 21 to page 2, line 13, amend the paragraph as:

In addition to utilizing unique design and quality to [appear] appeal to customers, there are also some extra measures to realize the anti-counterfeit purpose, such as the magnetic tape on the checkbook, the laser holograph on the credit card, and special marks

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which can only be seen under light with certain wavelength (U.S. Pat. No. 5,599,578). There are also methods using markers encapsulated in microspheres ( U.S. Pat. No. 6,030,657), utilizing a person's fingerprints (U.S. Pat. No. 5,360,628), adding antigen to the object [and detected] for detecting with antibody (U.S. Pat. No. 5,429,952, U.S. Pat. No. 5,942,444). Methods mentioned above are all meant to establish a technical or methodic barrier to prevent imitations and counterfeits. However, these known methods provide the protection of technical barrier which can be easily duplicated by [person] persons with the same technical skills. This invention is meant to provide a more specific anti-counterfeiting method which can not be easily duplicated by people equipped with the same technical skills.

**Page 2, lines 16-21, amend the paragraph as:**

This invention [utilizing] utilizes the uniqueness of [ribonucleic] nucleic acid sequences. After [, after] mixing [ribonucleic] nucleic acid with media, the media can be tagged onto or infiltrated into the authentic objects for anti-counterfeiting purpose. The authenticity of the objects can be verified by examining the existence and composition of [ribonucleic] nucleic acid.

**Page 2, line 22 to page 3, line 20, amend the paragraph as:**

A medium [need] needs to have the characteristics of being fully miscible with [ribonucleic] nucleic acid, and is not part of the objects being tagged. The composition of nucleic acid was designed to have specific length and sequence which can only be verified with certain PCR (polymerase chain reaction) primers. For tagging process, the

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medium is first liquefied in a solvent, and quantified amount of known sequence [ribonucleic] nucleic acid is added to the medium and mixed well. The medium with [ribonucleic] nucleic acid is to be used to spread or fill objects. The medium solidifies after the evaporation of the solvent. For authenticity check, a small part of the medium is taken from the object and dissolved in a solvent; a solvent with high [ribonucleic] nucleic acid solubility is then added to extract [ribonucleic] nucleic acid. Centrifugation is used to separate the solvent with high [ribonucleic] nucleic concentration which can be used to perform PCR amplification procedure to examine the authenticity of the [ribonucleic] nucleic acid. Through this procedure, if the examined object carries the original [ribonucleic] nucleic acid, the PCR procedure will amplify extracted [ribonucleic] nucleic acid several million times with the same size and sequence of the original [ribonucleic] nucleic acid. On the other hand, if the examined object does not have the original [ribonucleic] nucleic acid, there will be no amplified [ribonucleic] nucleic acid product. Therefore, by comparing the size and amount of PCR products, the authenticity of labeled objects can be verified.

**Page 3, line 21 to page 4, line 2, amend the paragraph as:**

Since [ribonucleic] nucleic acid has sequence specificity, when performing PCR procedures only PCR primers with correct sequences can produce the original [ribonucleic] nucleic acid. In addition, the concentration of [ribonucleic] nucleic acid in the medium is very low which is extremely difficult to be decoded through cloning and transgenic methods, therefore warrants a very high security and specificity for anti-counterfeiting purposes.

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**Page 4, lines 15-21, amend the paragraph as:**

This invention utilizes the characteristics of [ribonucleic] nucleic acid which allow replication only when the sequences of two terminal ends are known. The invention is to preserve [ribonucleic] nucleic acid in a medium and then label objects with the medium. If the authenticity of the object is to be examined later on, it merely needs to examine the composition of the [ribonucleic] nucleic acid in the medium for authenticity check.

**Page 4, line 22 to page 5, line 6, amend the paragraph as:**

[Ribonucleic] Nucleic acid is the general term for ribonucleic acid (RNA) [acid] and deoxyribonucleic acid (DNA). It can come from animal, plant, bacteria, fungus, virus et al., the so called organic organisms. But it can also be synthesized to form a vector or fragments. A unique characteristic of [ribonucleic] nucleic acid is that its specific sequence can be amplified with primers of specific sequences by PCR method. However, for PCR to work the prerequisite is that the terminal sequences of the [ribonucleic] nucleic acid fragment to be amplified is known in order to design primers with specific sequences for proper amplification.

**Page 5, lines 7-12, amend the paragraph as:**

The so-called medium is the intermediate used to encase [ribonucleic] nucleic acid and to attach to or mixed with objects. A good medium shall be able to mix well with [ribonucleic] nucleic acid, and can protect [ribonucleic] nucleic acid from deterioration. A medium also [need] needs to be moldable and has proper strength and

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can be attached to objects being labeled.

**ABSTRACT:**

This invention features a method of labeling objects for anti-counterfeit purpose, especially refers to a method employing [ribonucleic] nucleic acid for product anti-counterfeit labeling and authenticity verification by PCR (polymerase chain reaction) method. The procedure involves [label] labeling objects with medium which contains [ribonucleic] nucleic acid. For verification of authenticity, the medium is removed and extracted for [ribonucleic] nucleic acid which is then amplified by PCR method for comparison.